Concise Review: Human Pluripotent Stem Cells to Produce Cell-Based Cancer Immunotherapy.

Journal: Stem Cells

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Funding Grants: Targeted off-the-shelf immunotherapy to treat refractory cancers, Human Embryonic Stem Cell-Derived Natural Killer Cells for Cancer Treatment

Public Summary:
Pluripotent stem cells are cells that have the potential to self-renew by dividing and can give rise to all cells of the adult body. Both embryonic stem cells and induced pluripotent stem cells (cells that are reprogrammed from adult tissues) are pluripotent. Human pluripotent stem cells (PSCs) provide a promising resource to produce immune cells for adoptive cellular immunotherapy to better treat and potentially cure otherwise lethal cancers. Immune cells such as cytotoxic T cells and natural killer (NK) cells can now be routinely produced from human PSCs. These PSC-derived lymphocytes have phenotype and function similar to primary lymphocytes isolated from peripheral blood. PSC-derived T and NK cells have advantages compared with primary immune cells, as they can be precisely engineered to introduce improved anti-tumor activity and produced in essentially unlimited numbers.

Scientific Abstract:
Human pluripotent stem cells (PSCs) provide a promising resource to produce immune cells for adoptive cellular immunotherapy to better treat and potentially cure otherwise lethal cancers. Cytotoxic T cells and natural killer (NK) cells can now be routinely produced from human PSCs. These PSC-derived lymphocytes have phenotype and function similar to primary lymphocytes isolated from peripheral blood. PSC-derived T and NK cells have advantages compared with primary immune cells, as they can be precisely engineered to introduce improved anti-tumor activity and produced in essentially unlimited numbers. Stem Cells 2018;36:134-145.